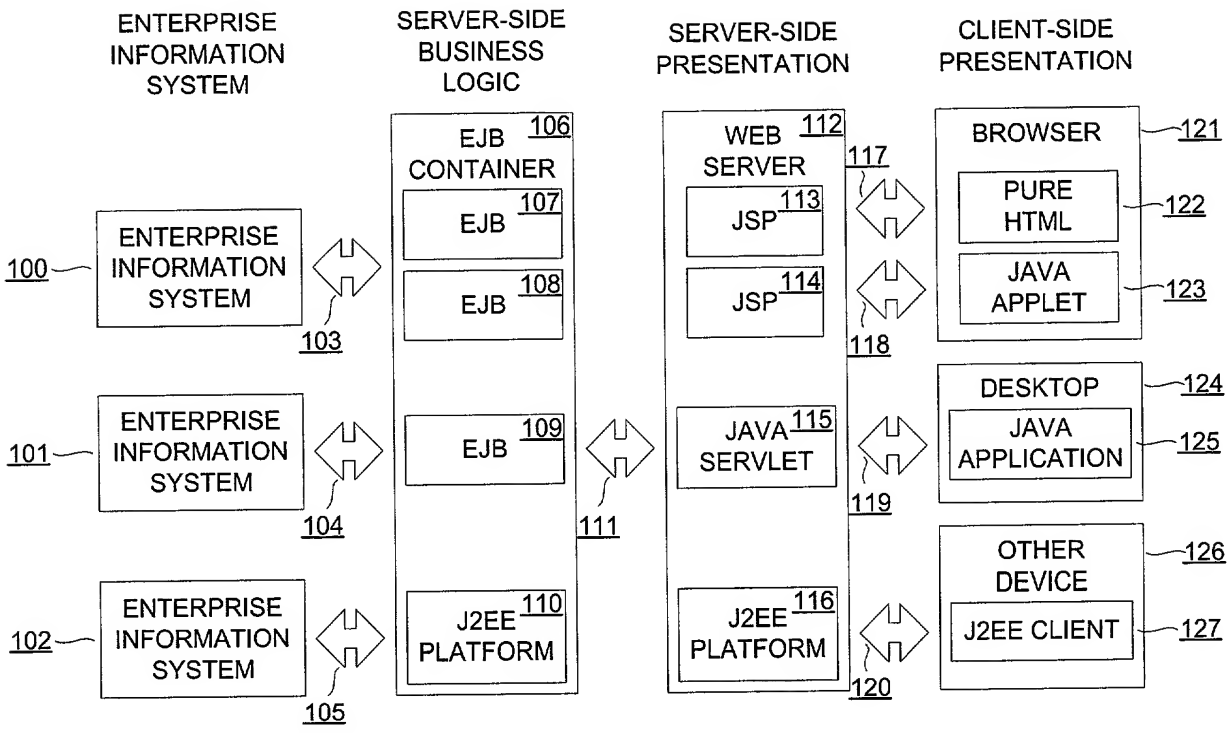
ENTERPRISE INFORMATION SYSTEM
SERVER-SIDE BUSINESS LOGIC
SERVER-SIDE PRESENTATION
CLIENT-SIDE PRESENTATION
EJB CONTAINER
106
EJB
107
EJB
108
EJB
109
J2EE PLATFORM
110
WEB SERVER
112
JSP
113
JSP
114
JAVA SERVLET
115
J2EE PLATFORM
116
BROWSER
121
PURE HTML
122
JAVA APPLET
123
DESKTOP
124
JAVA APPLICATION
125
OTHER DEVICE
126
J2EE CLIENT
127
ENTERPRISE INFORMATION SYSTEM
100
ENTERPRISE INFORMATION SYSTEM
101
ENTERPRISE INFORMATION SYSTEM
102
103
104
105
111
117
118
119
120

FIG. 1

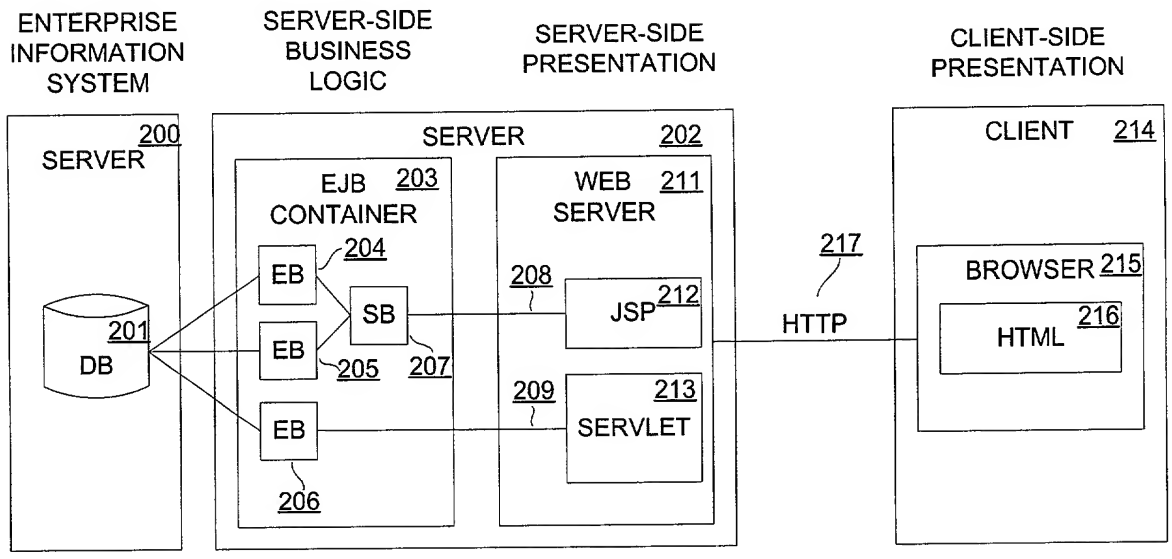
ENTERPRISE INFORMATION SYSTEM
SERVER-SIDE BUSINESS LOGIC
SERVER-SIDE PRESENTATION
CLIENT-SIDE PRESENTATION
SERVER
200
DB
201
SERVER
202
EJB CONTAINER
203
EB
204
EB
205
EB
206
SB
207
WEB SERVER
211
208
JSP
212
209
SERVLET
213
217
HTTP
CLIENT
214
BROWSER
215
HTML
216

FIG. 2

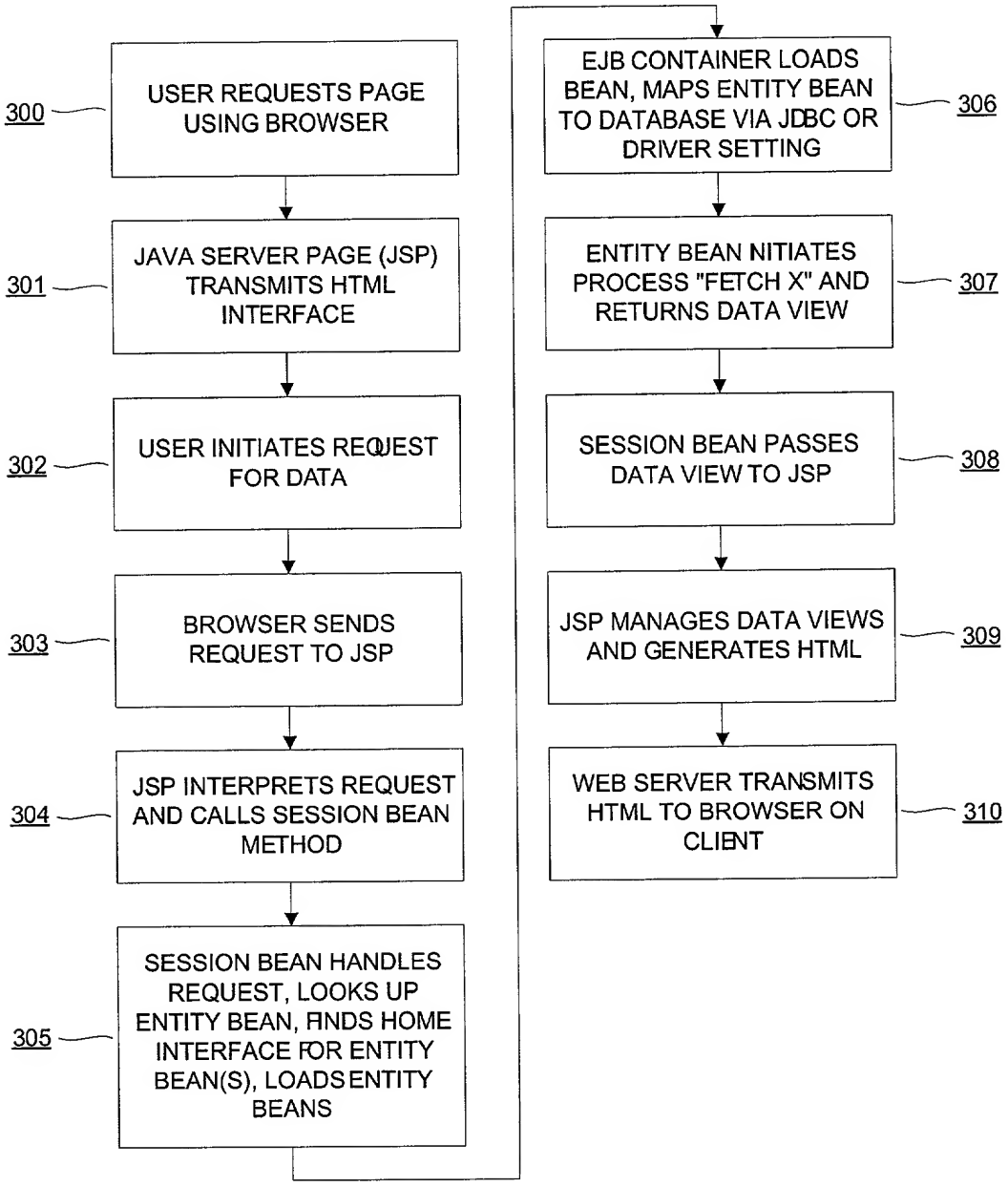
300
USER REQUESTS PAGE USING BROWSER
301
JAVA SERVER PAGE (JSP) TRANSMITS HTML INTERFACE
302
USER INITIATES REQUEST FOR DATA
303
BROWSER SENDS REQUEST TO JSP
304
JSP INTERPRETS REQUEST AND CALLS SESSION BEAN METHOD
305
SESSION BEAN HANDLES REQUEST, LOOKS UP ENTITY BEAN, FINDS HOME INTERFACE FOR ENTITY BEAN(S), LOADS ENTITY BEANS
306
EJB CONTAINER LOADS BEAN, MAPS ENTITY BEAN TO DATABASE VIA JDBC OR DRIVER SETTING
307
ENTITY BEAN NITIATES PROCESS "FETCH X" AND RETURNS DATA VIEW
308
SESSION BEAN PASSES DATA VIEW TO JSP
309
JSP MANAGES DATA VIEWS AND GENERATES HTML
310
WEB SERVER TRANSMITS HTML TO BROWSER ON CLIENT

FIG. 3

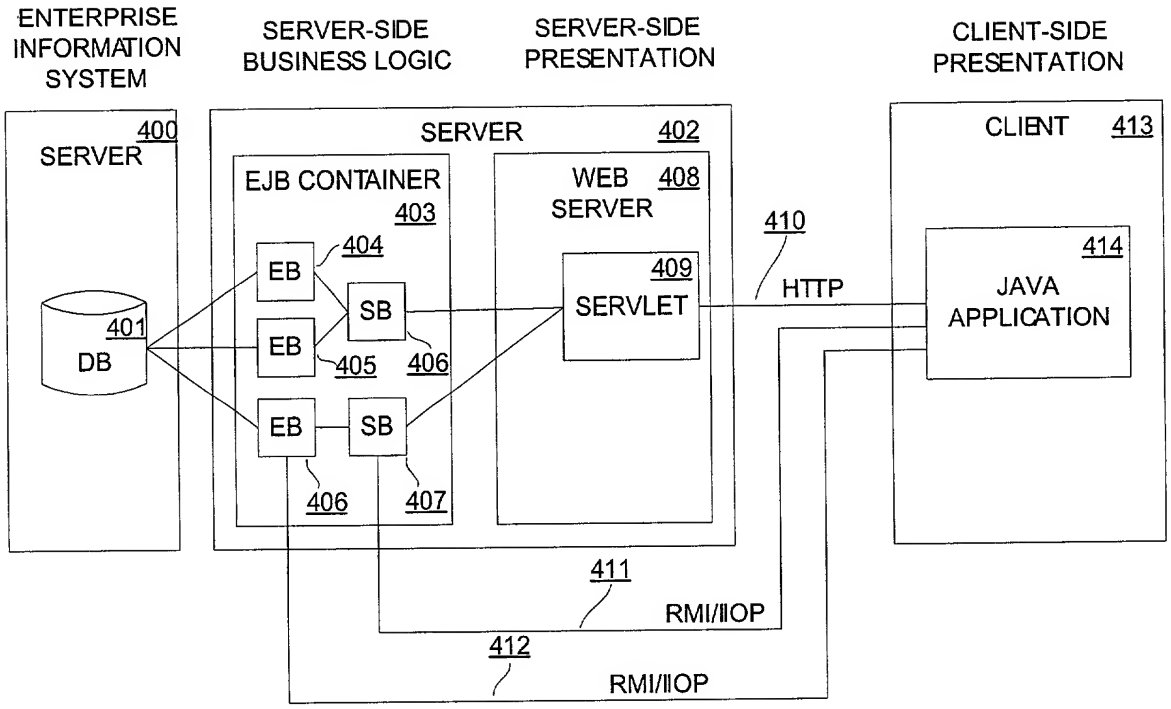
ENTERPRISE INFORMATION SYSTEM
SERVER-SIDE BUSINESS LOGIC
SERVER-SIDE PRESENTATION
CLIENT-SIDE PRESENTATION
400
SERVER
SERVER
402
EJB CONTAINER
403
WEB
408
SERVER
404
EB
SB
409
SERVLET
410
HTTP
414
JAVA APPLICATION
CLIENT
413
401
DB
EB
SB
405
406
EB
SB
406
407
411
RMI/IIOP
412
RMI/IIOP

FIG. 4

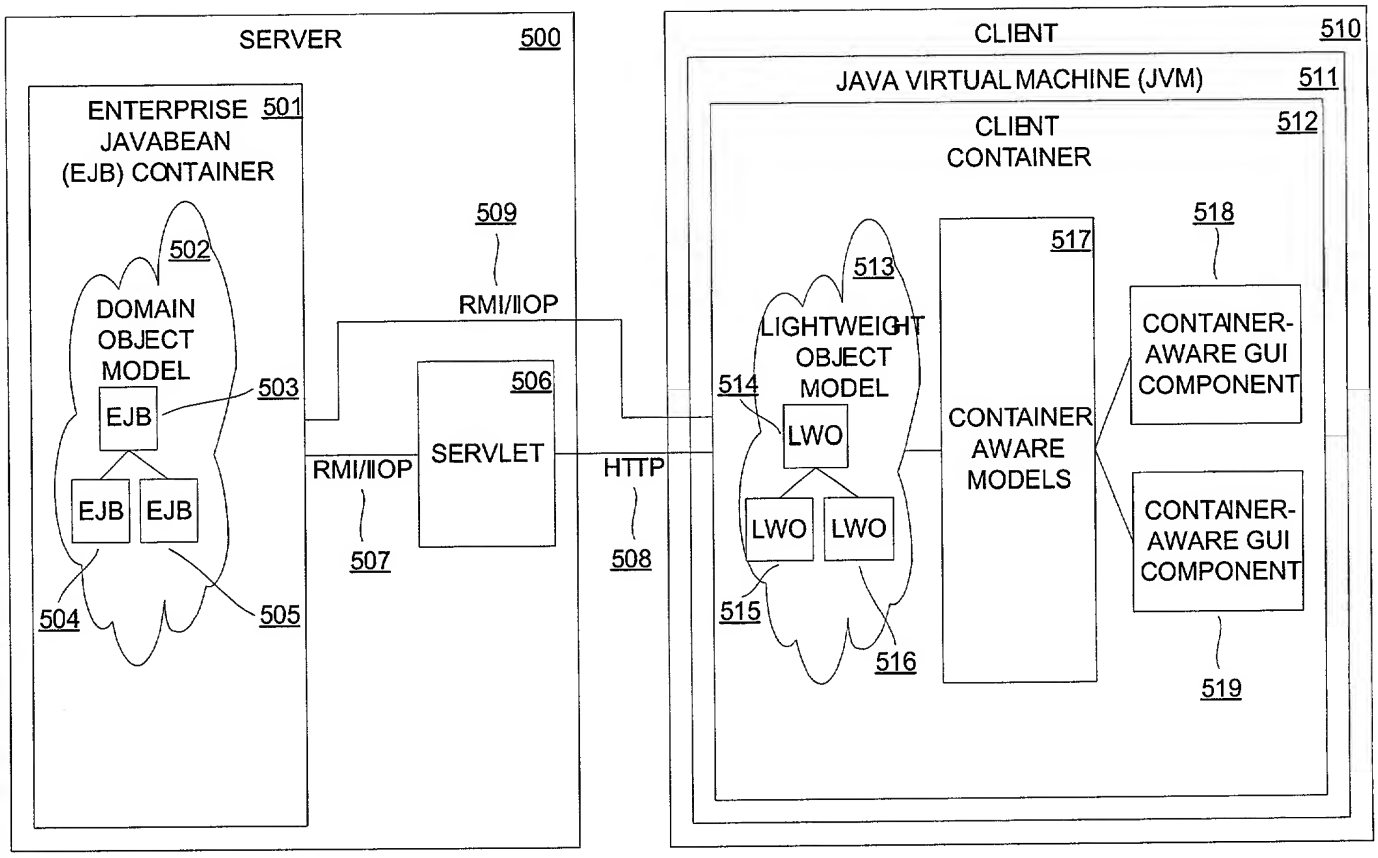
SERVER
500
ENTERPRISE JAVABEAN (EJB) CONTAINER
501
DOMAIN OBJECT MODEL
502
EJB
503
EJB
EJB
504
505
509
RMI/IIOP
506
SERVLET
RMI/IIOP
507
HTTP
508
CLIENT
510
JAVA VIRTUAL MACHINE (JVM)
511
CLIENT CONTAINER
512
LIGHTWEIGHT OBJECT MODEL
513
514
LWO
LWO
LWO
515
516
517
CONTAINER AWARE MODELS
518
CONTAINER-AWARE GUI COMPONENT
CONTAINER-AWARE GUI COMPONENT
519

FIG. 5

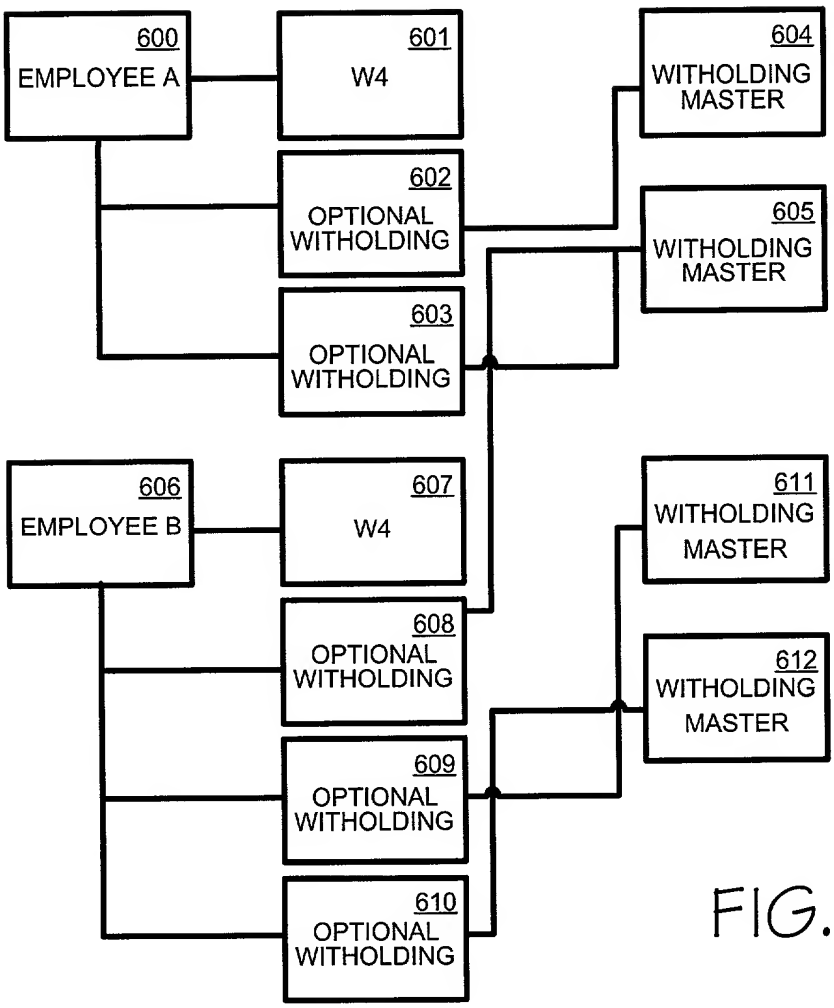

FIG. 6A

```
620   // build a graph descriptor for the employee and withholding information
621   GraphDescriptor gd = new GraphDescriptor("root");
622   gd.getRootDescriptor().addField("w4");
623   gd.getRootDescriptor().addField("optionalWitholdings");
624   // Now register the remote Employee and its associated graph with
625   // the client container.
626   LWCustomer lwCustomer = (LWEmploye e)
627   clientContainer.registerRemoteObject(remoteEmployee, gd,
628   "employeeWithHoldingGraph");
```

FIG. 6B

```
630   gd = new GraphDescritpor("root");
631   gd.getRootDescriptor().addField("address");
632   clientContainer.extendGraph(lwEmployee, remoteEmployee, gd);
```

FIG. 6C

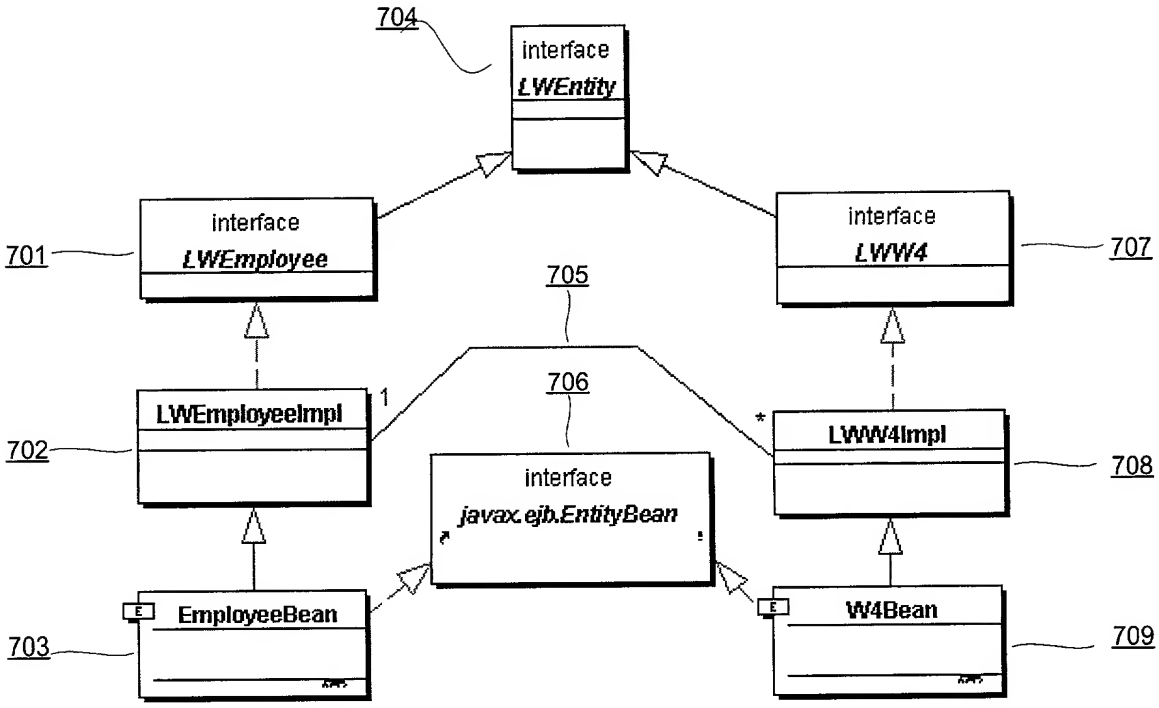
704
interface
LWEntity
interface
LWEmployee
701
interface
LWW4
707
705
706
LWEmployeeImpl
1
*
LWW4Impl
702
708
interface
javax.ejb.EntityBean
EmployeeBean
W4Bean
703
709

FIG. 7

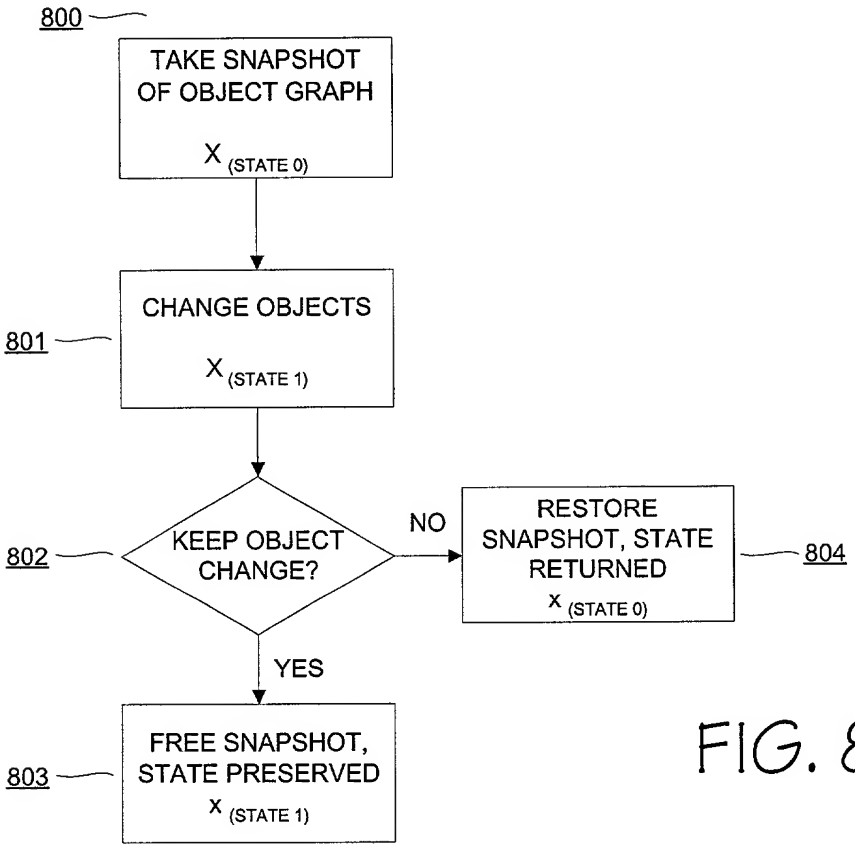
800
TAKE SNAPSHOT OF OBJECT GRAPH
X (STATE 0)
CHANGE OBJECTS
X (STATE 1)
801
KEEP OBJECT CHANGE?
802
NO
RESTORE SNAPSHOT, STATE RETURNED
X (STATE 0)
804
YES
FREE SNAPSHOT, STATE PRESERVED
X (STATE 1)
803

FIG. 8

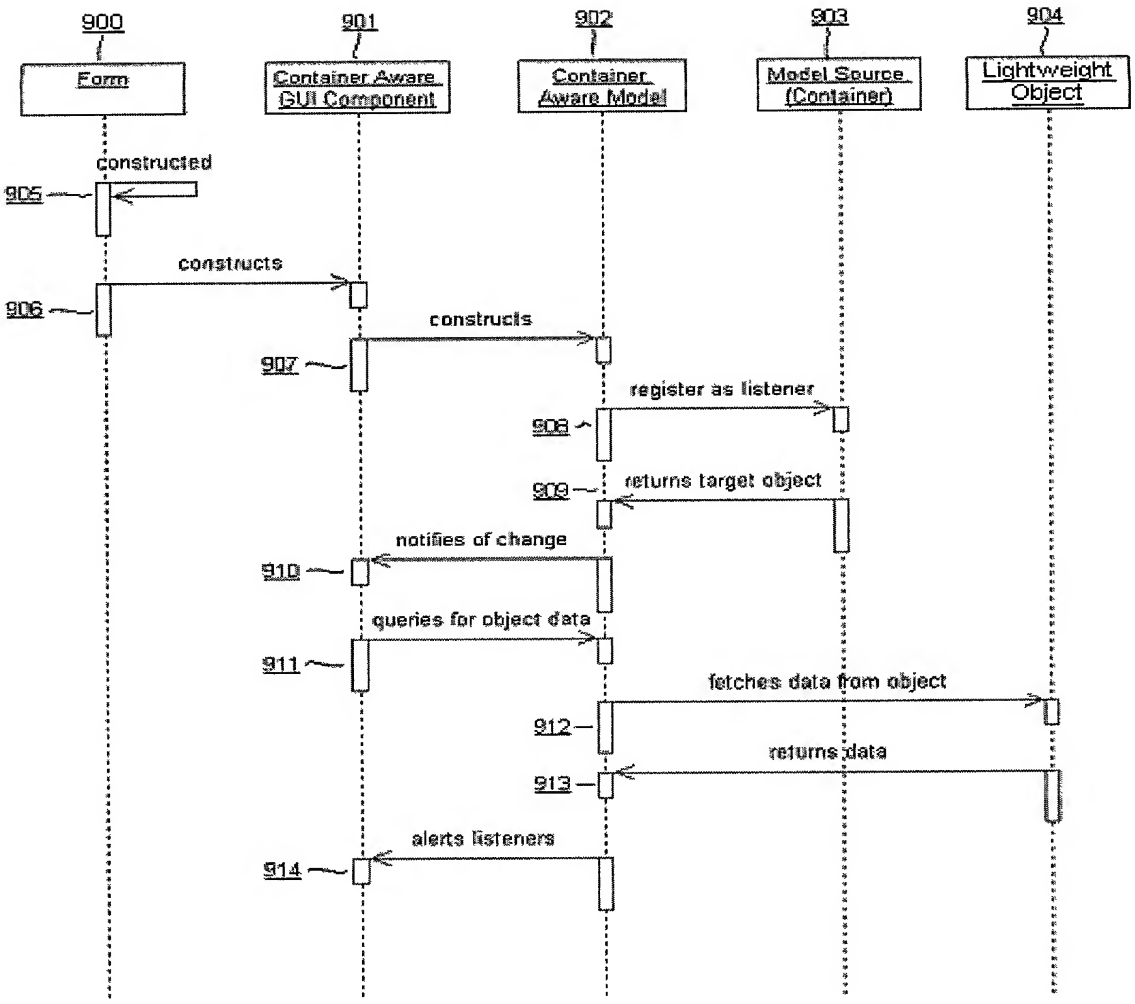
900
Form
901
Container Aware GUI Component
902
Container Aware Model
903
Model Source (Container)
904
Lightweight Object
constructed
905
constructs
906
constructs
907
register as listener
908
returns target object
909
notifies of change
910
queries for object data
911
fetches data from object
912
returns data
913
alerts listeners
914

FIG. 9

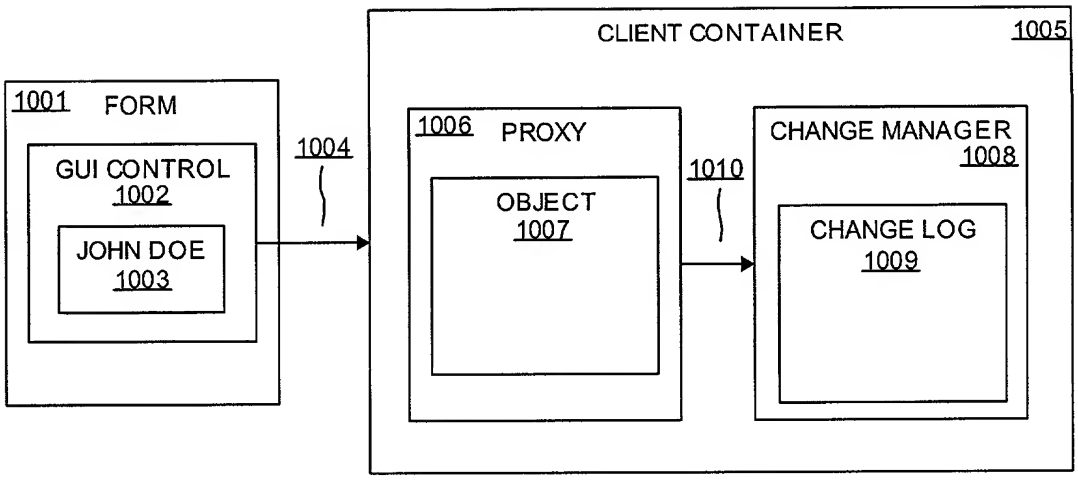

FIG. 10A

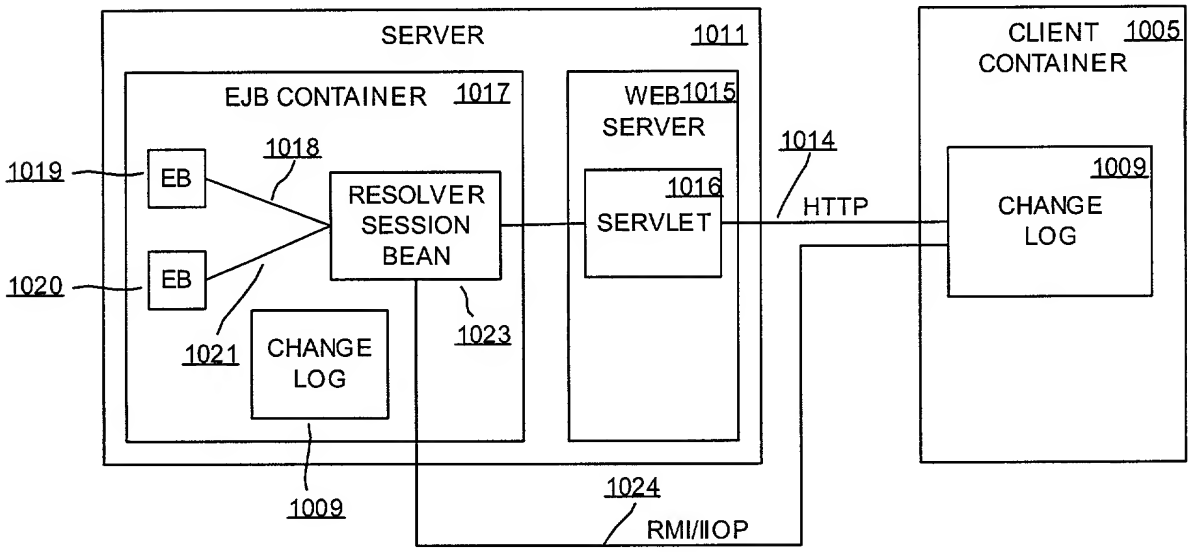

FIG. 10B

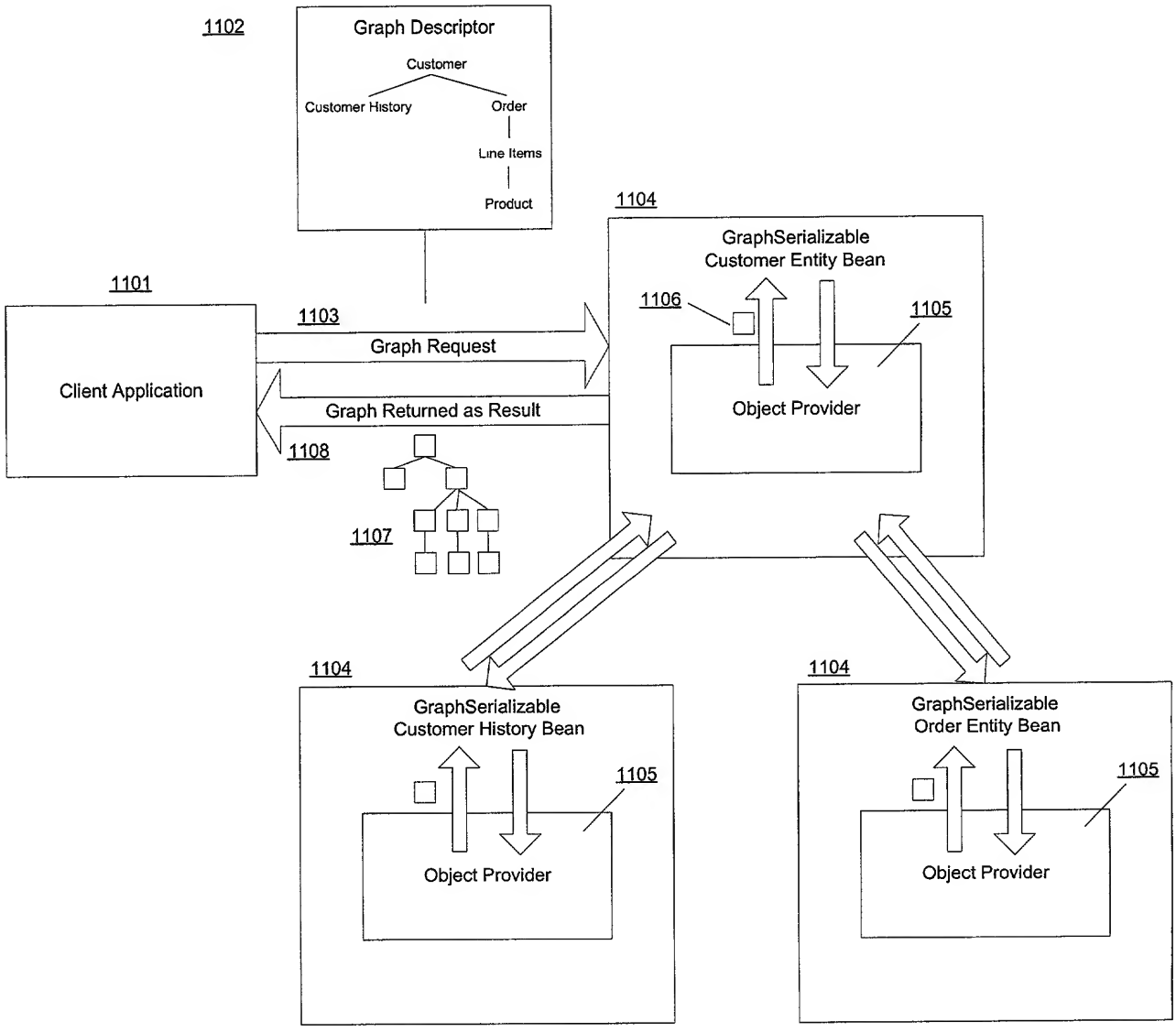
1102
Graph Descriptor
Customer
Customer History
Order
Line Items
Product
1104
GraphSerializable
Customer Entity Bean
1106
1105
Object Provider
1101
1103
Graph Request
Client Application
Graph Returned as Result
1108
1107
1104
GraphSerializable
Customer History Bean
1105
Object Provider
1104
GraphSerializable
Order Entity Bean
1105
Object Provider

FIG. 11